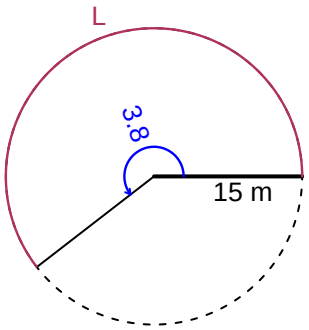
Name: Date:

u16we (Practice v1)

Question 1

In the figure below, we see a circle and a central angle that subtends an arc. The angle measure is 3.8 radians. The radius is 15 meters. How long is the arc in meters?

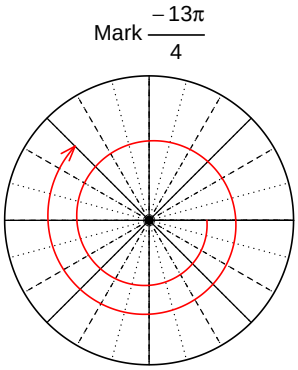


$$\theta = \frac{L}{r}$$

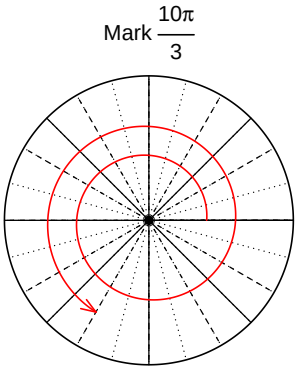
$L = 57$ meters.

Question 2

Consider angles $\frac{-13\pi}{4}$ and $\frac{10\pi}{3}$. For each angle, use a spiral with an arrow head to **mark** the angle on a circle below in standard position. Then, find **exact** expressions for $\sin\left(\frac{-13\pi}{4}\right)$ and $\cos\left(\frac{10\pi}{3}\right)$ by using a unit circle (provided separately).



Find $\sin(-13\pi/4)$



Find $\cos(10\pi/3)$

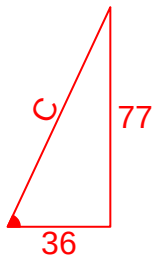
$\sin(-13\pi/4) = \frac{\sqrt{2}}{2}$

$\cos(10\pi/3) = \frac{-1}{2}$

Question 3

If $\tan(\theta) = \frac{-77}{36}$, and θ is in quadrant IV, determine an exact value for $\cos(\theta)$.

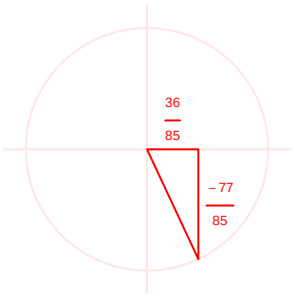
Ignore any negatives and the quadrant, and draw a right triangle in standard (quadrant I) orientation.



Solve the Pythagorean Equation

$$36^2 + 77^2 = C^2$$
$$C = \sqrt{36^2 + 77^2}$$
$$C = 85$$

Rescale the triangle so the hypotenuse is 1 to use the hypotenuse as a radius on the unit circle. Also reflect the triangle into Quadrant IV.



$$\cos(\theta) = \frac{36}{85}$$

Question 4

A mass-spring system oscillates vertically with a frequency of 6.21 Hz, a midline at $y = 7.28$ meters, and an amplitude of 2.86 meters. At $t = 0$, the mass is at the minimum height. Write an equation to model the height (y in meters) as a function of time (t in seconds).

Any of these equations would get full credit.

$$y = -2.86\cos(2\pi 6.21t) + 7.28$$

or

$$y = -2.86\cos(12.42\pi t) + 7.28$$

or

$$y = -2.86\cos(39.02t) + 7.28$$